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19 January 1978

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RESEARCH AND DEVELOPMENT

No. 27

WORLD

WIDE

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WORLDWIDE AFFAIRS

COMMUNICATIONS NETWORK ESTABLISHED IN ISMAILIA

Cairo MENA in Arabic 1230 GMT 23 Dec 77 NC

[Text] Alexandria, 23 December--The minister for transport, communications and maritime transport, Engineer 'Abd al-Sattar Mujahid, said that the city of Ismailia has been linked to an enormous telegraph and telephone communications network to enable newsmen, news agencies, radio stations and international television networks to conduct live coverage of the Ismailia meeting between President Anwar al-Sadat and Israeli Prime Minister Menahem Begin.

In a statement to MENA, the minister said that the telegraph and telephone communications authority in conjunction with the armed forces, has installed 155 telegraph, telephone and radio communications lines and circuits in record time in Ismailia, including 50 lines that will be allocated for the press and news agencies, 45 radio lines, 5 "order-wire" lines, 5 radio facsimile lines, and 50 telex lines. He added that 17 lines have also been allocated for radio and television, of which 16 lines are allocated to external radio broadcasts. Another 12 lines will be allocated to internal radio broadcasts and television which will connect Ismailia with Maspero [Cairo Radio studios].

Eng 'Abd al-Sattar Mujahid noted the work previously carried out at the Mena House Hotel to serve the local and international news media and to enable their correspondents to cover the Cairo preparatory conference for peace.

The minister expressed his gratitude to the armed forces, which utilized all their resources, in cooperation with the telegraph and telephone communications authority to prepare these installations without inconveniencing telephone subscribers in the region.

Through this cooperation, in only 48 hours the Mena House Hotel has been linked with the Ramsis central exchange by a microwave network consisting of 67 circuits.

Concluding his statement, the minister for transport said that after the conclusion of the Cairo conference, an additional 100 telephone lines will be added to the current capacity of the Al-Rawdah and Al-Haram telephone exchanges and that these will be distributed to subscribers in accordance with current regulations.

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WORLDWIDE AFFAIRS

**LIBYA, UGANDA TO COOPERATE IN NEWS DISSEMINATION**

Kampala Domestic Service in English 100 GMT 21 Dec 77 LD/EA

[Summary] Uganda's foreign minister, who is also in charge of the Information Ministry, Col Juma Oris, has received news-receiving equipment from Libya following the recent news exchange agreement between the two countries. The equipment was handed over to Colonel Oris in his office by the Libyan ambassador to Uganda, Mr Isma'il.

During the ceremony, the Libyan envoy said his country is ready to train any number of Ugandans in various fields, particularly in the news media. He also told the minister that his country's news agency was ready to receive and transmit Uganda news.

CSO: 5500

WORLDWIDE AFFAIRS

NGNA, EFE SIGN NEWS EXCHANGE AGREEMENT

Peking NCNA in English 1828 GMT 31 Dec 77 GW

[Text] Peking, 31 Dec (HSINHUA)--An agreement on the exchange of news between the HSINHUA News Agency and the EFE Agency S. A., was signed here this afternoon.

Tseng Tao, director of the HSINHUA News Agency, and Luis Maria Anson, Chairman of the board of directors and president of the EFE Agency S. A., signed the agreement on behalf of their respective news agencies.

Present at the signing ceremony were Peng Ti, leading member of the HSINHUA News Agency, and Rafael Zaera, minister-counselor of the Spanish Embassy in Peking.

Luis Maria Anson is scheduled to leave here for home via Canton shortly.

CSO: 5500

WORLDWIDE AFFAIRS

LJUBLJANA TV REACHES PARTS OF AUSTRIA, ITALY

Belgrade TANJUG Domestic Service in Serbo-Croatian 1640 GMT 29 Dec 77 LD

[Text] Ljubljana--The Ljubljana radio and television is now also transmitting its program from its transmitter on Mount Pec [Italian name: Monte Forno] on UHF channel 47. This transmitter makes it possible for the program to be received in part of the upper Sava River Valley, in part of the Valle di Canale in Italy, and in Austria in the Villach area, in part of the Gail River Valley and in part of the area west of Klagenfurt.

The [Mount] Pec transmitter was built and made ready for operation as far back as 22 January 1977, but it could not be commissioned due to the well-known negative stand of the Austrian side. The Federal Administration for Radio Communications in Belgarde has now allowed, with its regulation, the temporary operation of the transmitter.

CSO: 5500

INTER-ASIAN AFFAIRS

BRIEFS

SINGAPORE-SRV COMMUNICATIONS--Singapore and Vietnam have resumed direct telephone and telex services. The telecommunications authority of Singapore said the service is available from 0930 to 1730 daily. The number of countries with which Singapore has direct telex service is now 26. [Text] [Singapore Domestic Service in English 1138 GMT 29 Dec 77 BK]

CSO: 5500

## TESTS FOR A DOMESTIC SATELLITE COMMUNICATIONS LINK

Madras THE HINDU in English 21 Dec 77 p 1

[Text]

The Madras Earth Station of the Satellite Telecom Experiment Project (STEP) is expected to be commissioned by the month-end. The experiment is being jointly conducted by the Indian Space Research Organisation (ISRO) and the Post and Telegraph Department.

The use of satellites for communications purposes became a distinct possibility in 1957 when the Soviet Union launched the "Sputnik" into space. The scope for steady and uninterrupted space telecommunication was further boosted when the United States perfected the geo-stationary satellite.

A geo-stationary satellite rotates and spins in such a manner that its speed synchronises with that of the earth around its axis. The result is that it appears stationary to a person on the earth. From its vantage point in the sky the synchronous satellite can "see or illuminate" (reach) 40 per cent of the area of the globe. It thus removes the constraints imposed by the limited height of TV and microwave towers.

India is geographically well placed to take advantage of the space technology for setting up a telecom and TV network. The country is sufficiently near the equator above which alone a synchronous satellite can be posi-

tioned. This type of satellite was first utilised in 1965 through INTELSAT, a consortium of 80 nations including India.

A satellite communication system essentially employs microwave techniques. But it differs in respect of power levels as well as reception. The antenna is pointed to the satellite for constant optimum illumination. This system has to depend on limited wave bands. The equipment of the earth stations are said to have a reliability of 99.99 per cent.

The Madras Earth Station will work with 'Symphonie', the Franco-German satellite through digital transmission on channels allotted by the International Telecom Union. It will conduct experiments on establishing remote area communication with terminals mounted on jeeps, which can be moved on land or air lifted.

Other experiments will relate to integration of the satellite circuits into the national automatic telephone service. Some modifications will have to be made in TAX signalling systems to make it possible to route a call via the satellite. Another major experiment is to relay live TV programmes. There are three main earth stations in Delhi, Ahmedabad and Madras.

The basic aim of the experiment, to be completed by May 1979, is to develop the necessary modifications in the switching equipment in the TAXS and to field test them. The tentative cost for the P & T Department will be about Rs. 1 crore and ISRO will be spending about Rs. 2.50 crores.

A transponder leased from INTELSAT has provided for 60 channels between Madras and New Delhi. As many as 36 channels will be used for communications with remote areas. These experiments are expected to start from January 1978.

The Indian satellite programme is expected to start in 1980 and tenders have been invited for the supply of a satellite. This will be a multipurpose domestic satellite catering to needs of P & T, Civil Aviation and Meteorological Departments, Doordarshan and All India Radio.

The main thrust in STEP is to gain systems, hardware and operational experience that will be directly useful for the country's future domestic satellite communications system. The experiments would follow standard earth station practices as far as possible without sacrificing flexibility. Official sources say that the testing in operation would be a very exciting and important part of the experiment. It will prove the worth of the mobile earth station concept and the knowhow available in the country.—Our Staff Reporter.

CSO: 5500

MALAYSIA

BRIEFS

RADIO TRANSMITTERS--Malaysia has just ordered from Thomson-CSF two short wave radio transmitters and their antennas. Rated at 2 x 500 kW, the transmitters are among the most powerful in the world, and will enable the "Voice of Malaysia" to be heard in Oceania, Asia, Middle East, and Europe, as broadcast from the Kajang station. They are expected to be on the air in 1979. The contract was won by Thomson-CSF after a closely contested international call for bids. The company has installed similar transmitters in Gabon, Libya, Sweden, Norway, as well as a set of eight transmitters in France, at Issoudun. [Text] [Paris ELECTRONIQUE ACTUALITES in French  
2 Dec 77 p 7] 11023

CSO: 5500

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SINGAPORE

MORE SATELLITE EARTH STATIONS MAY BE ESTABLISHED

BK161337Y Singapore THE STRAITS TIMES in English 16 Dec 77 p 21 BK

[Summary] The Telecommunication Authority is looking into the possibility of providing another earth station to enable Singapore to keep up with the growing traffic in international and regional satellite communications. The new station would be linked to either the U.S. Maritime Satellite System or the International Maritime Satellite System.

"Singapore is planning ahead to participate in the growing activities in the field of international and regional satellite communications," said a Telecommunication Authority spokesman. "These include the upgrading of the existing Sentosa Earth Station or providing a new earth station to operate to the new series known as Intelsat V satellites, which would be operated by the International Telecommunications Satellite Organization (Intelsat)." At present, the Sentosa Earth Station accommodates two Intelsat antennae. By expanding the station, another one or two more antennas may be located in Sentosa.

CSO: 5500

SRI LANKA

BRIEFS

TELECOMMUNICATION VIA SATELLITE--According to a spokesman for the Overseas Telecommunications Service, international telephone, telegraph and Telex traffic via satellite has increased by more than 300 percent with the commissioning of the (Palluka) earth satellite station. These facilities provide communications with nine countries. [Colombo International Service in English 1045 GMT 24 Dec 77 BK]

CSO: 5500

THAILAND

CABINET APPROVES SRV PROPOSAL FOR RADIOTELETYPE LINK

BK210754Y Bangkok Domestic Service in Thai 1300 GMT 20 Dec 77 BK

[Excerpts] The director general of the Public Relations Department, Kamchat Kiphanit, in his capacity as spokesman of the Prime Minister's Office, reported on the regular weekly cabinet session on 20 December. The meeting, which took place at Government House, was chaired by Prime Minister Gen Kriangsak Chamanan. It discussed several matters.

The cabinet agreed to the Communication Ministry's request to accept Vietnam's proposal to open a radioteletype link. According to the Communications Ministry, Vietnam has telegrammed the Aeronautical Radio of Thailand proposing the opening of a radioteletype link between Bangkok and Ho Chi Minh City using radio signal "SS." The proposal also gave details about the transmitters and receivers as well as the frequency to be used.

The Aeronautical Radio of Thailand has all the necessary equipment ready for the immediate opening of a radio teletype link between Bangkok and Ho Chi Minh City. The matter has already been brought to the attention of the Civil Aviation Committee.

The committee feels that the Aeronautical Radio of Thailand should accept the proposal, since it is the government's policy to establish friendly relations with Thailand's neighbors, particularly Laos, Vietnam and Cambodia, and since the opening of a radioteletype link would be positive gesture from Thailand to pave the way for earlier negotiations on overflights between Thailand and Vietnam. The committee's decision was approved by the Communications Ministry.

CSO: 5500

VIETNAM

SRV TO REORGANIZE COMMUNICATIONS SERVICES

[Editorial Report BK] Hanoi Domestic Service in Vietnamese at 1100 GMT on 25 December 1977 carries the Council of Ministers report read by Le Thanh Nghi to the Sixth SRV National Assembly's third session on 20 December. The following excerpt is drawn from a passage dealing in general with transport and communications:

"With regard to communications and the postal service, in 1978 and the years following we should reorganize the communications and postal services throughout the country; promote close coordination between the communications and postal service system and the radio-TV broadcasting system; improve the wired communications system in the north; build the wired communications network in the south; develop the Hanoi-Ho Chi Minh City-Minh Hai wired communications service; bring into full play the working capacity of the existing communications technical equipment in the south; devote part of the army-managed communications and liaison equipment and facilities to supporting economic work; strengthen the communications network in various cities and industrial areas; improve, expand and build the automatic domestic telephone network in various cities and industrial areas, first of all in Hanoi; gradually extend telephone service to production installations and villages in the deltas and midlands; and consolidate and expand the international communications stations.

"In 1978 the value of communications and postal service is expected to increase by 11 percent over 1977."

CSO: 5500

VIETNAM

CUU LONG PROVINCE PUTS NEW RADIO IN OPERATION

Ho Chi Minh City Domestic Service in Vietnamese 0245 26 Dec 77 BK

[Text] With the assistance of the Vietnam Radio and Television Commission in planning and providing equipment and after a period of testing the Voice of the People of Cuu Long officially began broadcasting on 22 December on the medium wave of the 315 meter band, that is 950 kHz. The station broadcasts four programs a day: [all times GMT] 2200-2300, 0400-0500, 0730-1030, 1330-1430.

The Voice of the People of Cuu Long is the voice of the Cuu Long provincial party organization. It is an official information organ which officially disseminates the provincial party organization's line and policies to every citizen and reflects all activities in the province.

CSO: 5500

CZECHOSLOVAKIA

BRIEFS

TV TEST OPERATIONS--A television transmitter for the Second Program, which is to cover the Senica District and parts of the Bratislava suburbs and of southern Moravia, started test operations in Borsky Mikulas 23 December. [Prague RUDE PRAVO in Czech 24 Dec 77 p 2 AU]

TV TRANSMITTER IN BOHEMIA--A new television transmitter for the First and Second Programs, which is to cover eastern Bohemia and part of Moravia, started test operations on Cerna Hora Hill in the Krkonose Mountains 23 December. Its tower is 76 meters high. [Prague RUDE PRAVO in Czech 24 Dec 77 p 2 AU]

CABLE RADIO NETWORK--Almost 790 towns and communities in the CSSR are receiving radio broadcasts by cable radio. The network was up to 530 radio centers and 1.461 million relay sets [reprodukto] to serve 656,000 receivers. [Prague RUDE PRAVO in Czech 24 Dec 77 p 2 AU]

NEW TELEVISION TRANSMITTER--The seventh television transmitter thus far of the basic network of the second program on the territory of the West Bohemian region was commissioned on Krkavec Hill, near Plzen, today. Its signal will cover the remaining areas of the regional capital and part of Rokycany District. Another transmitter on the Vrani Vrch Hill near Postrekov in Domazlice District will have been added by the end of the five-year plan period. This will insure that the majority of West Bohemian territory will be covered by the second program and color transmissions of Czechoslovak television. [Text] [Prague Domestic Service in Czech 1630 GMT 29 Dec 77 LD]

CSO: 5500

BOLIVIA

BRIEFS

MICROWAVE SYSTEM FOR TELEVISION--The Bolivian Television Enterprise has adopted the microwave system and discarded the earlier system of relay stations. The first of the new microwave equipment has been installed in La Paz and Oruro and will start functioning within the next few days. The television enterprise has a short-term plan of installing its own microwave network, independent from that of the National Telecommunications Company [ENTEL], to extend television throughout Bolivian territory. [La Paz Radio Fides in Spanish 1130 GMT 9 Dec 77 PY]

CSO: 5500

BRAZIL

SATELLITE PROGRAM TO RESUME WITH VENEZUELA, COLOMBIA

Rio de Janeiro O GLOBO in Portuguese 10 Dec 77 p 9

Text Brasilia--The Brazilian domestic satellite program, deactivated in June of this year, is now to be resumed with Venezuela and Colombia. During the visit made by President Carlos Andres Perez to Brazil, this subject was discussed at the technical level, and studies are already being initiated for a technical commission composed of individuals from all three countries. The high cost of the project was the principal reason for which Brazil interrupted the satellite studies; the satellite is expected to be used especially for communications in the Amazon River region.

Even before launching the domestic satellite, whose objective is to improve communications throughout the national territory--principally connecting the more inaccessible regions with those of the Amazon River region--Brazil already warranted an exclusive position among the signers of the INTELSAT (International Organization of Telecommunications via Satellite) system.

Despite Brazil's having the domestic satellite, it will not abandon the INTELSAT system. On the contrary, combining the two systems, the government hopes to achieve a highly efficient level of national and international telephonic communications of radio and TV transmissions.

The pursuit of that development began last year, when Brazilian participation in INTELSAT amounted to 9.5 million cruzeiros, which put the country in fourth place among the major investors in the system. Only the United States, the United Kingdom and France have greater voting powers than Brazil.

The INTELSAT organization was established in 1964 as an international commercial company aimed at planning, implementing and controlling Western communications via satellite. Now, with 95 member countries, the organization has a net worth of \$900 million, providing Brazil with a pre-fixed annual income of 14 percent.

Experts Say Project Can Be Profitable

On 8 June of this year, the government announced the cancellation of competition for the implementation of a domestic system of telecommunications via

satellite. According to a memorandum issued by the press section of the Ministry of Communications, the cancellation was justified "in view of the present economic-financial conjuncture, keeping in mind the fact that the commitment of the necessary funds for its execution could be used for other projects considered more urgent."

On this occasion there were some who saw in the cancellation of international competition for the Brazilian communications satellite "the last step in the process of draining the Ministry of Communications in the area in which it was the most advanced and ambitious."

After 4 years of discussions and studies, the government opened the competition in April 1976 upon considering the project viable from the technical and economic viewpoint and further justifying the strategy on the priority basis of "Amazonian integration."

For experts in the field, that strategic option represented the fundamental error of the Brazilian telecommunications satellite project. Instead of giving emphasis to the integration aspect, what should be done--according to those experts--would be "to favor its technological and economic viability as a system of communications to be operated commercially on a profitable basis."

When the project was canceled, approximately 50 million cruzeiros had already been spent on technical studies. During the same period, the complete system of communications via satellite could cost \$160 million (or 2.3 billion cruzeiros) to be amortized in 10 years, which would amount to less than \$20 million per year.

On the other hand, the experiences of other countries indicate that "throughout the world, satellites yield profit." For example, Canada already uses three domestic satellites to connect the remote points of a country larger than Brazil and to interconnect large centers by telephone, telex, information communications, television communications, etc.

Finally, it is well to remember that, in the same memorandum in which the Ministry of Communications announced the cancellation of competition, it was decided that Brazilian Telecommunications Corporation (TELEBRAS) "will take the necessary steps with specific international organizations to assure that the present reservation of positions in the geostatic orbit will be maintained for a possible future resumption of the project."

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CSO: 5500

BRAZIL

EMBRATEL TO ACTIVATE 9,000 TELEPHONE CIRCUITS IN DECEMBER

Rio de Janeiro O GLOBO in Portuguese 11 Dec 77 p 23

Text A total of 9,000 direct telephone circuits and an additional TV channel between Rio and Sao Paulo will be activated this month by EMBRATEL Brazilian Telecommunications Company, which will place in operation a new trunk line of high-capacity microwaves to handle the international and interurban communications services of those two cities. The existing routes consist of 5,400 telephone circuits and two TV channels, in addition to another 1,800 circuits reserved for the Vale do Paraiba region.

With a concentration of more than 75 percent of Brazil's telecommunications traffic, Rio and Sao Paulo are the states which have the greatest density of utilization of the systems offered. Between the metropolitan areas of the two capitals alone, there is a monthly flow of about 2.1 million interurban connections, with more telephone calls being made from Sao Paulo to Rio, almost 1.1 million.

Meeting the Demand

According to EMBRATEL President Haroldo Correa de Matos, "the new capacities that will enter into circulation yet this year will be able to take care of the growth in the demand for telecommunications between Rio and Sao Paulo until 1983, when the coaxial cables will be in operation in that route, capable of conducting up to 64,000 channels in special systems (supergroups)."

He said that, "with the slowdown in the expansion plans of the state telephone companies," EMBRATEL also decided to postpone the installation of the coaxial cables, since the activation of a new trunk line and a few amplifications in the present structure would be sufficient to handle the requirements." Coaxial cables have a high installation cost, even if manufactured in Brazil; the material used is one of expensive production (2,500 cruzeiros per meter at the present price).

The principal advantages in using cables--which are installed at a depth of 1.5 meters, with subterranean repeaters every 1.5 kilometers to amplify the signals--are found in low maintenance costs and great circuit capacity, which

even makes it possible to accommodate television transmissions. At the present time, only the United States is using coaxial cables for public communications. The Rio-Sao Paulo route, consisting of 500 kilometers, will enter into operation in 1979.

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BRAZIL

BRIEFS

COMMUNICATIONS INVESTMENTS FOR 1978--Sao Paulo--Minister of Communications Euclides Quandt de Oliveira said yesterday that his ministry will invest 27.2 billion cruzeiros in 1978 to conclude the programs under way in the communications sector and effect more than 450,000 new telephone connections. Quandt de Oliveira came to Sao Paulo to attend the luncheon of the Brazilian Electro-Electronic Industry Association and close the 2d National Meeting of Advertisers, organized by the Brazilian Advertisers Association. In his speech closing the meeting, the minister of communications said that he cannot fail to recognize the contribution of advertising in the economic growth of the country, since it stimulates consumption, resulting in increased production and employment. "Meanwhile," he observed, "it must be recognized that, in promoting this growth, advertising influences the nation's social-cultural development in a negative way." [Text] [Rio de Janeiro O GLOBO in Portuguese 10 Dec 77 p 22] 8568

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NIGERIA

AEROSTAT STATIONS, BROADCAST SERVICE PLANNED

Ikeja THE PUNCH in English 13 Dec 77 p 15

[Text]

THE Federal Ministry of Communications has concluded plan to establish an aerostat station at Ogurugu near Nsukka to ensure reliable communication and broadcast coverage.

The station will serve Anambra, Imo, Cross River, Rivers and part of Kwara, Bendel, and Benue States.

This was revealed by the Federal Director of Communications Engineer, I.O.A. Lasode in a paper he presented at the symposium on the tethered aerostat balloon system currently holding at the University of Nigeria, Nsukka.

He said that the station will be fitted with sophisticated relay transmitters, receivers, broadcast and documentary equipment to satisfy the need of the area it serves.

The director indicated that similar aerostat post will be established by his ministry in various parts of the country to serve Lagos, Ondo, Ogun States and the northern part of the country.

Engineer Lasode added that the Ministry of Communications will implement a nation-wide television and radio broadcasting service with three simultaneous colour television broadcasts which will offer programme to every home in the country.

CSO: 5500

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## SOUTH AFRICA

### SAAN COMPUTER-EDITING SYSTEM INTRODUCED

Johannesburg SUNDAY TIMES in English 11 Dec 77 p 3

[From the "Business Times" section]

[Text] You are holding history in your hands--this week's Business Times is the first newspaper in southern Africa to be produced by electronic editing.

The multi-million rand system commissioned by South African Associated Newspapers this week is the first of its kind in the southern hemisphere and one of the most advanced in the world.

Designed in America by Atexing, and already used by a number of prestige publications, the process has been hailed as the biggest advance in printing since the invention of the linotype machine in 1885.

The article you are now reading was written without paper or typewriter and edited without the use of a pen.

And this is how it works:

Journalists working for the newspapers in the SAAN group will be equipped with a complex keyboard linked to a screen similar to a television set. These two instruments together comprise a unit called the video display terminal (VDT), which replaces the newsman's typewriter, pen and paper.

The keyboards have the basic keys of the standard typewriter, plus many others with computer-related functions. Instead of typing their stories on to paper, journalists will now see their work displayed on screens.

Every reporter's unit will be linked to a central computer, and once he is satisfied with his story he will commit it to the computer's memory. Stories coming in from reporters will be stored in the computer along with international news items arriving from the world's major news agencies, and copy from newspapers in the SAAN group.

Editors and other senior newspaper personnel will then be able to call stories from the memory and read them to judge whether they should be used and in what way they should be presented.

In the past, the items they selected were handed in typewritten form to sub-editors who worked against time to correct them on paper.

Now all newspaper items can be sent directly from one screen to another. All alterations can be made by sub-editors at the touch of a few buttons.

Once this has been done the story is sent to a photo-typesetting machine.

This machine produces the story in type--ready for printing.

CSO: 5500

## SOUTH AFRICA

### COMPUTER STAFF SHORTAGE REPORTED

Johannesburg THE STAR in English 7 Dec 77 p 28

[Text]

The serious shortage of computer staff in South Africa continues. Although the position improved slightly over the past year, it is estimated that the industry is currently short of nearly 1 100 people.

And, according to an annual survey, the shortage by the end of August next year is expected to rise over 1 700. These figures compare with total employment in the industry today of 11 400 people.

The survey is the ninth produced by Computer Personnel, the country's largest computer staff selection consultancy, and is considered the authoritative document on the industry. It was based on a sample of 311 companies throughout the country.

#### BASIC REASONS

"It is ironic that while people in many other jobs are being laid off because of the recession, the computer industry is still crying out for staff," says Mr John Raymond, managing director of CPL and the man who compiled the survey.

There are two basic reasons for the continuing shortage, said Mr Raymond. Firstly, suppliers of computer equipment report a successful year, which means that companies are investing in better business information systems to help them cope in the current economic climate.

"In other words, the installation and upgrading of computers is outstripping the training and development of people necessary to fill the gap."

Secondly, the high turnover rate in the industry was not helping matters. While fewer immigrants were coming here because of the political situation, more South Africans were emigrating. Indeed, Australia, which has a worse computer staffing problem than ours, was actively recruiting in South Africa.

"All these factors will compound the problem in the future," said Mr Raymond.

#### SOLUTION

What is the solution? "This lies with the computer user himself. He will have to recruit raw

staff and train them himself. The onus lies with him — not the computer suppliers, who supply training courses.

"It takes between six and 12 months to provide a recruit with basic computer training. Sure, it's expensive, but only in this way will the continuing shortage of computer staff be alleviated," Mr Raymond said.

Other points which emerged from the survey:

- Salaries, generally, were up 12 percent on 1976.
- The number of women in the industry increased.
- Thirty-five percent of programmers in Johannesburg are women.
- The number of non-Whites in the industry also increased about six percent. In the operations and data capture fields, 39 percent of staff in Johannesburg were non-White while at the coast, because of the availability of Indians and Coloureds, the figure was around 75 percent.

SOUTH AFRICA

ELECTRONIC INDUSTRY GROWS RAPIDLY

Johannesburg THE STAR in English 7 Dec 77 p 30

[Text]

South Africa's fledgling electronic industry is growing at the exceptional rate of 31 percent a year — three percent more than the world average.

This was revealed by Mr Errol Scott, who has launched a new company, SBO (Pty), to market locally manufactured electronic components and sub-assemblies. SBO's major supplier will be Sparrat Electronics, the East London-based component and sub-assembly manufacturer that was officially opened last month.

A turnover of R5m is projected from Sparrat's first year of operation. At the opening ceremony, the chairman of Federale Volksbeleggings, Dr P E Rousseau, anticipated a R3m saving in foreign exchange resulting from Sparrat's activities.

"A major portion of our production involves sub-assemblies for the television and audio industry," says Mike Bosworth, managing director of Sparrat. "Because Sparrat is a

wholly-owned subsidiary of SATV, manufacturers of Telefunken television and audio equipment, there could be some sensitivity in the market place if an independent third party was not involved in the marketing."

Mr Scott says that although SBO was formed essentially to market Sparrat products, the company will represent a number of foreign component manufacturers. But it is expected that no more than 30 percent of the company's business will involve foreign suppliers.

"We are operating on the basis that R50m out of the estimated R150m spent on electronic components in South Africa each year, is not 'captive' or committed to supply by a foreign principal or licence holder."

According to Mr Scott, growth potential for the electronics industry is tremendous, particularly in the industrial and professional fields.

CSO: 5500

SOUTH AFRICA

ELECTRONICS OUT TO BEAT SANCTIONS

Johannesburg SUNDAY TIMES in English 25 Dec 77 p 1

[Article by Tony Koenderman in the "Business Times" section]

[Text] **SOUTH AFRICA'S infant electronics industry is moving fast to mitigate the effects of possible sanctions on the supply of computers from abroad.**

STC, part of the Altech group, plans to be producing a large capacity (one megabyte) military specifications mini-computer, using components from non-American suppliers, within six to 12 months.

Data systems division manager Rainer Moringer says that apart from some transistors and crystals, almost all of the electronic components, which will comprise about 50 per cent of the final cost of the machine, will be imported in completely knocked down kits ready for local assembly.

But the remaining 50 per cent, made up of labour input, the cabinet, keyboard and other non-electronic components, will comprise the local content initially.

STC is aiming specifically at the market of Government and military departments which are affected by restrictions on the supply of computers. Mr Moringer calculates there is a market for 300 to 500 computers in the next five years.

They will cost about a third more than a comparable commercial computer at present on the market, with a typical configuration coming in between R50 000 and R100 000.

Local content will be pushed up at a later stage to 60-64 per cent, but Mr Moringer says that "as long as components can be obtained from overseas it will not be economic to produce most of them locally."

Complete local manufacture, he estimates, would increase the cost of a computer at least 10 times.

Another local computer manufacturer, Messina Electronics, has notched up sales and orders worth more than R300 000 for its locally-designed micro-computer, the Commander, since the company was established in April.

It is a wholly-owned subsidiary of The Messina (Transvaal) Development Company.

The Commander, designed for mining, industrial and commercial needs, has been installed by Southern Cross Steel and Palmiet Chrome, both Barlow Rand companies, Colgate-Palmolive and two Messina mines in Rhodesia — Norah and MTD Mangula.

Messina Electronics has also won an order from the Bantu Affairs Administration Board for the Central Transvaal in the face of competition from established overseas-based computer companies.

It also has a design and manufacturing contract from Hamac Computers for point-of-sale computer terminals.

"The threat of overseas embargoes on computer equipment has also given our business a fillip," says general manager Peter Abery.

"We have received a number of approaches from Government concerns and commercial computer organisations to manufacture some of their requirements locally.

Among other local manufacturing developments in the data processing industry are:

Anker Data Systems' ADS 4900 point-of-sale computer terminal;

Data Management Services' Syfa, to be produced with 30 per cent local content under licence from Computer Automation of the United States.

USSR

## COMMUNICATIONS SATELLITES FOR TELEVISION BROADCASTING

Moscow ZEMLYA I VSELENNAYA in Russian No 5, Sep-Oct 77 pp 8-15

[Article by USSR Minister of Communications Doctor of Technical Sciences N. V. Talyzin]

[Text] Even before the appearance of communication satellites political and economic contacts and the necessity for the exchange of information required and still require the broadening of distant and superdistant telephonic and telegraphic communications, including intercontinental communications, and also the development of communications with remote and inaccessible regions and countries having extensive territories.

The extensive development of television broadcasting, the international exchange of television programs and their transmission over enormous distances led to the necessity for organizing wide-band television communication channels which could be accomplished only in the decimeter and centimeter radio wave ranges.

Simultaneously with the vigorous development of all types of surface electrical communication, the creation of cable, radio relay and tropospheric communication lines, insuperable technical difficulties sometimes began to appear in the creation of superlong communication lines caused by the distances, transits across the oceans and existence of inaccessible regions on the earth. This involved great economic expenditures and extremely prolonged development periods.

For the Soviet Union, with its enormous territory and diversified, frequently complex and severe climatic conditions, the universal organization of wide-band channels for the transmission of television programs is a very serious problem.

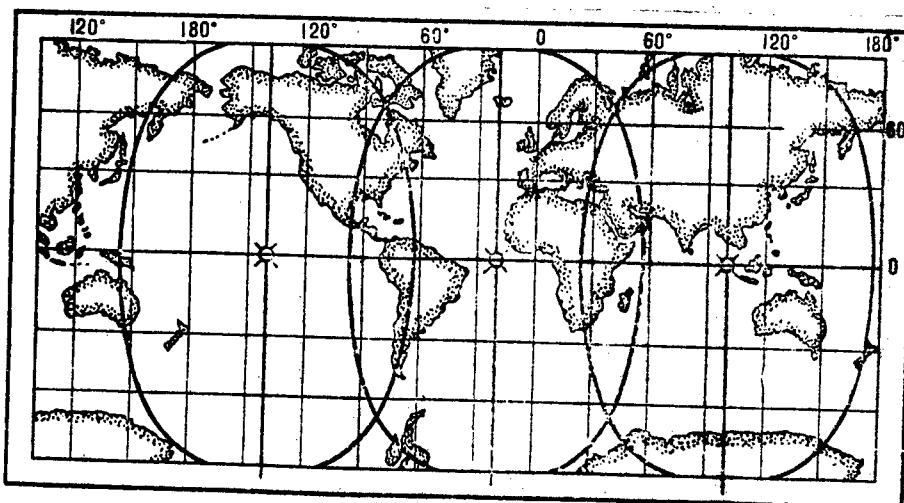
At first television broadcasting in the USSR developed in the following way: television centers were constructed in the capitals of the union and autonomous republics and in the large cities of densely populated industrial regions. This approach made it possible to show television programs which had been produced by local television studios. The concept of USSR

Central Television had still only been formed. To be sure, this did not solve the problem of showing in television programs all the cultural riches of the Soviet people and did not afford the Soviet people living in regions distant from Moscow the possibility of in some way being direct participants in the important political events occurring in Moscow and to view on their television screens the performances presented in the leading theaters of the country and to be "ticket holders" to the most interesting sports competitions. This became possible after the transmission of Central Television programs from Moscow began to local television centers and transmitters operating by cable and radio relay communication lines.

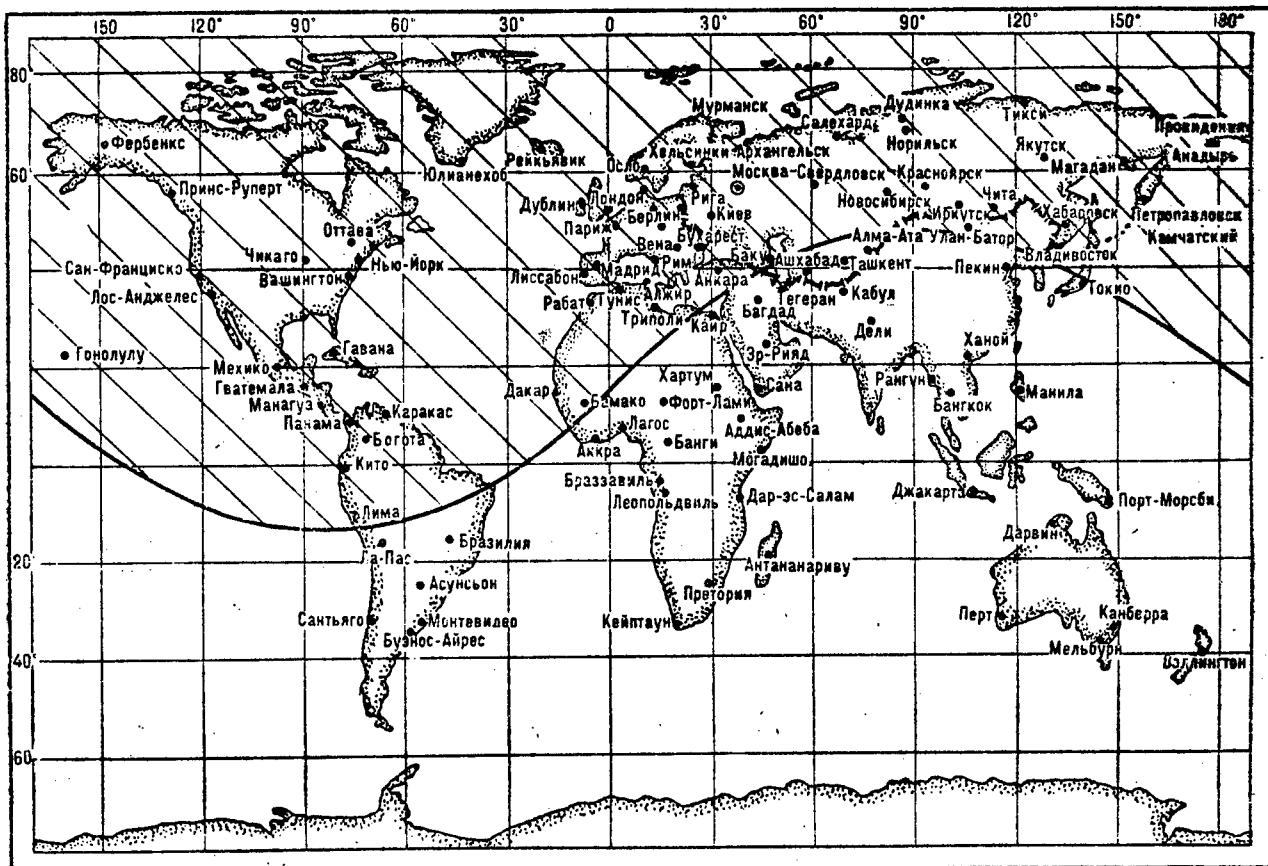
#### Satellites Come to the Assistance of Communications Specialists

Under the conditions prevailing in such a large country as ours, satellite communication has exerted and now exerts inestimable assistance in accelerating the development of television broadcasting everywhere in the territory of the Soviet Union.

It is known that radio waves in the decimeter and centimeter ranges are propagated linearly like a light ray. Accordingly, for transmission of a television signal over great distances by means of one intermediate station relaying it, this "station" must rise to such a height above the earth's surface that both the transmitting and receiving ground stations are simultaneously in its field of view.



Zones of visibility of geostationary satellites. Three such satellites, whose parking points are displaced by  $120^\circ$  in orbit, provide global communication



Zone of servicing of "Molniya" artificial earth satellite (shaded)

Communication satellites situated at an altitude of 30,000-40,000 km above the earth are capable of relaying transmitting station signals for distances up to 12,000-15,000 km. A highly important characteristic of communication satellites is the capability of forming over a long period of time a constant zone of visibility -- a servicing zone within which ground space communication stations can exchange information via the particular satellite.

From this point of view there are two types of satellites used at the present time for communication purposes which are most advantageous. These are geo-stationary satellites and satellites in high elliptical orbits.

Geostationary satellites revolve in a circular orbit situated in the equatorial plane at an altitude of about 36,000 km above the earth's surface. They revolve around the earth in the same direction and with the same period as the earth and therefore are constantly situated over one and the same point on the earth's surface. For the terrestrial observer such satellites seem

to be fixed in place. The zone of visibility of these satellites on the earth's surface almost does not change with time and the ground stations situated in this zone can constantly maintain communication through such a satellite. However, geostationary satellites do not ensure communication in the polar regions.

The territory of the Soviet Union is not covered by a single geostationary satellite and therefore communication between Kamchatka and Chukotka and Moscow cannot be accomplished by relaying through one such satellite.

Communication satellites of another type revolve around the earth in high elliptical orbits with an apogee of about 40,000 km and a perigee of about 500 km; inclination of the orbital plane to the equator -- 63.5°. These satellites have a period of revolution of 12 hours and in 24 hours make two revolutions around the earth. With motion in orbit at an altitude of 30,000-40,000 km, that is, in a region close to the apogee, in the course of six to eight hours they "cover" a large part of the northern hemisphere. Such satellites ensure communication over the entire territory of the Soviet Union and with their use both in the main orbits (apogee over the eastern hemisphere) and in conjugate orbits (apogee over the western hemisphere) it is possible to accomplish communication from Moscow or from other stations within the limits of almost the entire northern hemisphere, including the polar regions.

Four satellites in high elliptical orbits, whose planes are displaced relative to one another by 90°, ensure around-the-clock communication with brief breaks for transfer from one satellite to another.

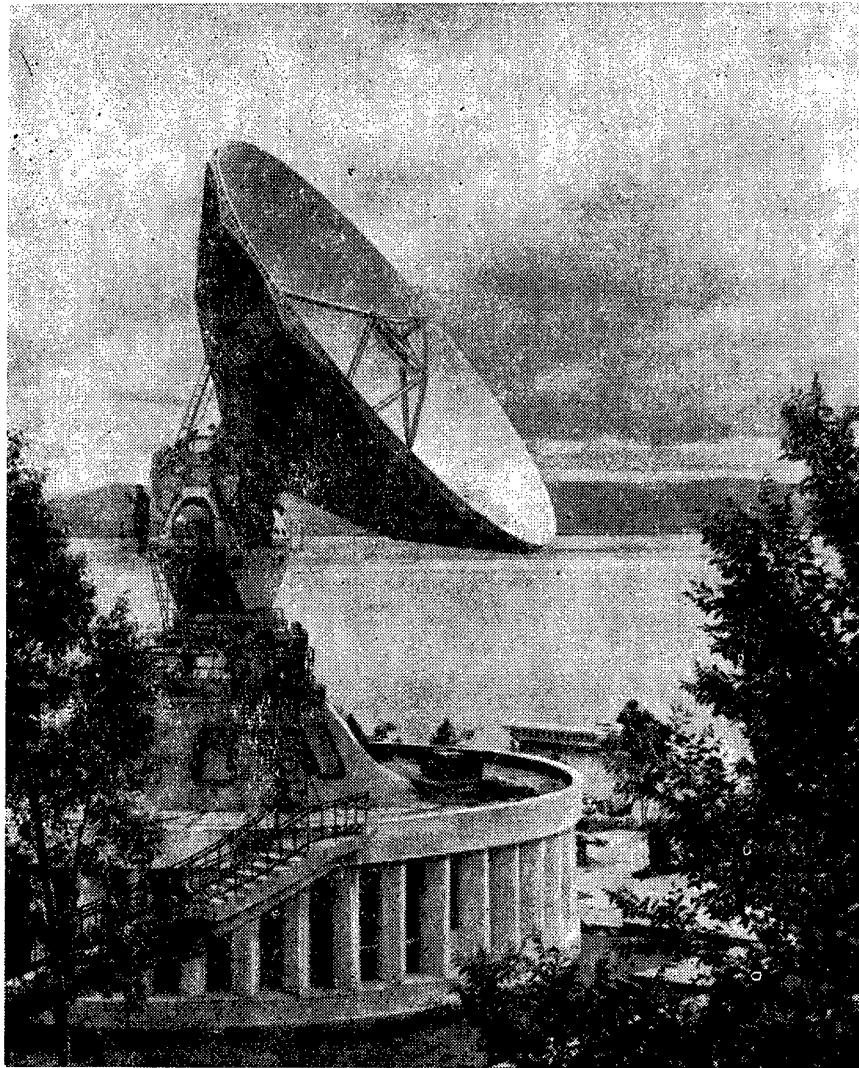
#### "Orbita" System

The first "Molniya-1" Soviet communication satellite was put into an elliptical orbit in April 1965. By means of this it was possible to begin transmission of Central Television programs to Vladivostok and back (see ZEMLYA I VSELENNAYA, No 4, 1965, pp 54-57. Editor's note).

However, the "Molniya-1" satellites were faced with broad tasks -- ensuring transmission not only to Vladivostok and not only the programs of Central Television, but also the transmission of all types of information to tens of administrative and industrial centers in Siberia, the Far East, the Far North and Central Asia.

It was necessary to create an extensive satellite communication television distribution system which was later given the name "Orbita."

A highly important problem in creating such a system, requiring the construction of a great number of surface stations and considerable capital expenditures, was the optimizing of the technical characteristics of the satellite and ground network stations. If this was not done, the system would be far more expensive.



"Orbita" ground station at Khabarovsk

The radio signals emitted by the communication satellite cover distances of 30,000-40,000 km to receiving stations on the earth, in the process experiencing enormous attenuations. The signals reaching the earth's surface are very weak. In order to detect them it is necessary to have complex sensitive receivers and great antennas. It is understandable that the more powerful the signals emitted by the satellite, the simpler and cheaper can be the surface receiving stations and the more rapidly and with the lesser cost their number can be increased.

However, an increase in the power of the on-board transmitters, on the one hand, leads to great expenditures on the development, construction and launching of a satellite, and on the other hand, it is limited by the present level of development of space technology and the highly complex technical problems which arise in creating space vehicles.

A number of complex technical problems in constructing communication satellites was solved in the development and construction of the "Molniya-1" satellite. Solar cells were used; their panels were oriented on the sun, which ensured a high efficiency of the use of their surface and a high energy resource of the satellite. The power of the on-board transmitter was 40 W and considerably exceeded the power of the transmitters of foreign communication satellites of that time. The pencil-beam on-board antenna with motion of the satellite in orbit was constantly oriented on the center of the earth.

In this way it was possible to ensure a greater effective power of the emitted signals and due to this use relatively simple ground receiving stations of the "Orbita" type with a dish diameter of the parabolic antennas of 12 m. At the same time, in foreign satellite communication technology specialists have constructed far more complex ground stations with antennas having a diameter of 25-30 m and super-highly sensitive receivers cooled by liquid helium. Soviet industry in a very short time not only mastered equipment for the "Orbita" stations but also organized its standard production.

In 1967, by the 50th anniversary of the Great October Socialist Revolution, the "Orbita" television distribution system was put into operation. It consists of 21 ground stations in remote regions of Siberia, the Far North, Far East, Central Asia and Kazakhstan.

The network of "Orbita" stations increased intensively during the years which followed. This was favored by the active participation of local Party and soviet organs with the employment of local funds for this purpose.

Seventy-five stations have now been constructed in many cities and even settlements of remote regions in the USSR -- in places where there is a relatively great population and where the construction of such a station is economically justified. Today virtually all cities with a large population have central television.

A number of the "Orbita" stations, in addition to the reception of programs from Central Television, are used for telephonic-telegraphic communication and the exchange of other types of information: reception of radio broadcasts, phototelegraphic exchange, reception of newspaper mats. The number of such multipurpose "Orbita" receiving-transmitting stations will be increased by means of reconstruction of stations constructed initially only for the reception of television.

Together with the development of the network of ground stations there has also been improvement in satellite communication. The different "Molniya-2," "Molniya-3" and the "Raduga" geostationary satellites appeared in high elliptical orbits. They considerably broadened the possibilities not only of satellite television, but also satellite communication in general.

However, applicable to the problems of the "Orbita" television distribution network these satellites made possible a considerable improvement in the quality of transmission of television programs and made it possible to proceed to multiprogram satellite color television broadcasting.

From the time of entry of the "Molniya-2" satellites into operation, working in the centimeter range of radio waves (4-6 GHz), allocated by international agreement for satellite communication, the quality of reception of color and black-and-white television programs on the "Orbita" stations has come to correspond completely to the international norms.

The "Molniya" satellites can transmit a television program immediately to the entire Soviet Union, but with respect to time it is not very suitable for some regions. The territory of the USSR occupies 11 time zones. When it is 2000 hours at Kamchatka and Chukotka, time for the evening programming, on the Kola Peninsula it is 1000 hours and it is mostly children who are at the television sets. In order for viewers to see television at an hour which is convenient for them it was necessary to organize the transmission of programs by zones, each of which includes two or three hour zones. For each of these zones a particular program is transmitted which is "tied in" to the time in that zone.

The transmission of several television programs is accomplished since the beginning of 1977 by the "Molniya-2," "Molniya-3" and "Raduga" satellites.

In addition, the development of the ground communication network made it possible using radio relay and cable line facilities to transmit the first Central Television program to remote cities in Siberia where there are "Orbita" stations. The transmission of a second television program via the "Raduga" satellite has been organized in these cities. The number of Central Television programs transmitted to different cities in the Soviet Union will be increased.

Thus, a rapid solution is being obtained for the highly important problem defined by the 25th Congress of the CPSU -- ensuring the reliable reception of Central Television over the entire territory of the Soviet Union.

At the present time all the densely populated regions of the country are covered by zones of servicing by surface television centers, transmitting stations, powerful and low-power relay stations.

However, there are still many small populated places in the northern part of the country, in Siberia, which do not fall within the reach of existing television stations. It is virtually impossible to transmit Central Television programs to such small populated places by stations of the "Orbita" type. The construction of tens of thousands of such stations would require enormous capital expenditures and a long time. And, indeed, is it reasonable to construct an "Orbita" station for a populated place where only tens or hundreds of persons live?

Naturally, the question arose as to whether it is possible for a satellite to carry a more powerful television transmitter and to ensure in an enormous servicing zone the reception of Central Television programs by the use of simple receivers. Such a system was investigated theoretically in detail. The computations indicated that it is more advantageous to use the method of frequency modulation of signals, rather than amplitude modulation, such as used in ordinary television. In this modulation method the television channel requires a broader frequency band, but the power of the on-board transmitter can be several times less.

A television transmitter carried on a satellite cannot be used in the same frequency ranges which are employed for modern television sets or it will create television broadcasting interference.

Television signals from such a satellite are received relatively simply using a pencil-beam antenna oriented on the satellite with an accuracy of  $\pm 1-3^\circ$  in azimuth and angle of elevation and a special receiver (converter). The converter transforms frequency modulation into amplitude modulation and the frequency of the television signal arriving from the satellite into the frequency of one of the reception channels present in modern television sets.

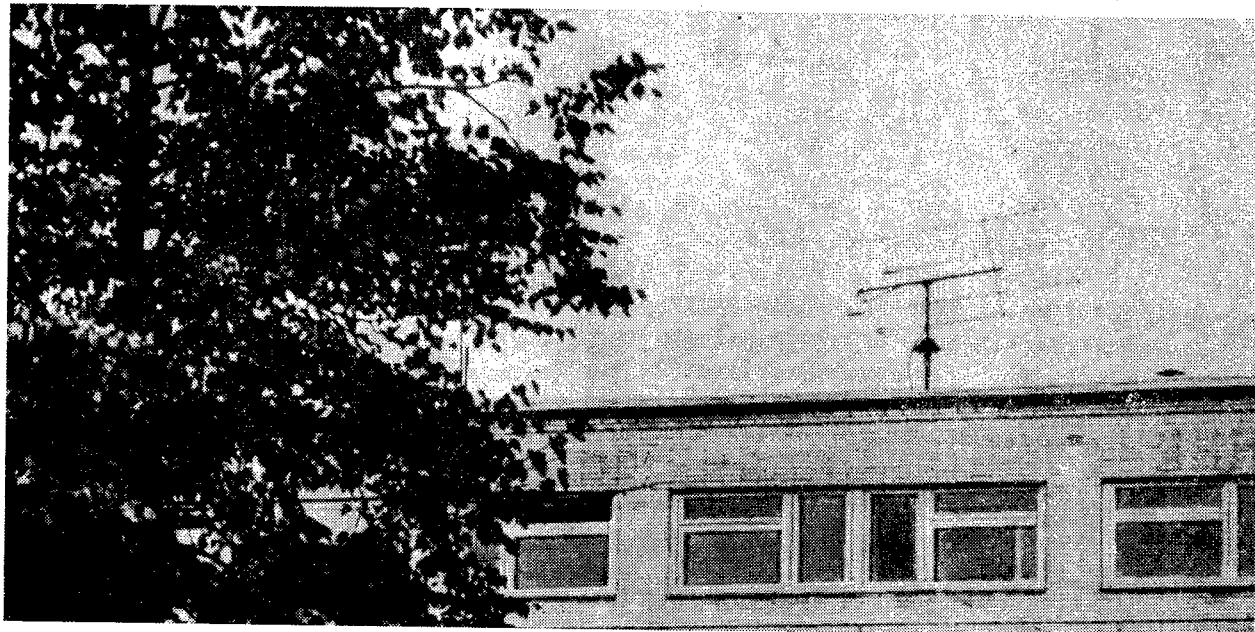
It is most desirable that this entire set of equipment be used at once for an entire populated place. Even in the case of television antennas in most cases we use collective rather than individual types. And it is economically advantageous to use a collective apparatus for the reception of signals from a satellite -- one per populated place. Thus, the signals received from the satellite are transformed in frequency and with respect to the type of modulation by collective receivers, are relayed by low-power (up to 1 W) surface transmitters and are received by domestic receivers. The transformed signals from the collective receiver can also be transmitted to television sets by means of cable networks similar to the cable networks for the collective antenna used in apartment houses.

The receivers in the ground network are supplied with pencil-beam antennas which from considerations of simplicity and low cost do not have turning apparatus but are oriented on the satellite once in the initial setting. Accordingly, during the entire time of operation the satellite is seemingly fixed in position relative to a ground observer, that is, is held with a high accuracy (of about  $1-0.5^\circ$  in longitude and latitude) in a given position in a geostationary orbit.

The power of the on-board transmitter is determined by the simplicity of the receivers, the selected frequency range, the extent of the servicing zone and the efficiency of the on-board antenna.

The on-board antennas of the satellite must also be pencil-beam. The errors in orientation of the on-board antennas narrow the servicing zone. If the orientation error is only 10% of the width of the directional diagram of

the on-board antenna, the servicing zone will be about 60% of its maximum possible value.



Antenna of "Ekran" receiving system

#### "Ekran" Satellite

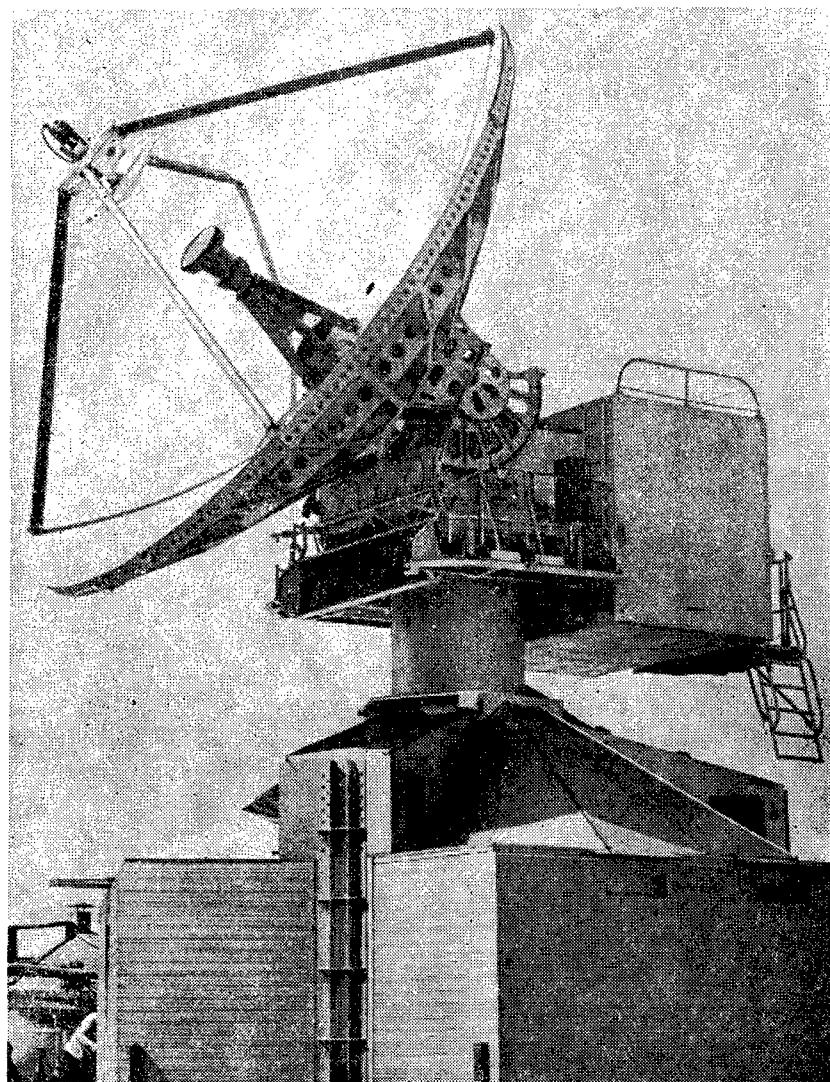
A satellite assigned the conventional name "Ekran" was launched into a geostationary orbit on 26 October 1976. The satellite has an on-board transmitter with a power of 200 W and a pencil-beam on-board antenna -- a phased array with an area of  $12 \text{ m}^2$ .

The systems for orienting and correcting the "Ekran" satellite ensure an accuracy in holding the satellite at a stipulated point in a geostationary orbit of  $1-0.5^\circ$  and an accuracy in orienting the on-board antennas of  $30-40'$ . Orientation of the panels of solar cells on the sun is ensured.

The servicing zone of the "Ekran" satellite, situated at a parking point of  $99^\circ\text{E}$ , extends from Novosibirsk to Yakutsk. In this zone there is assurance of a high strength of the electromagnetic field at the earth's surface of about  $25 \mu\text{V/m}$ , which makes it possible to use extremely simple collective apparatus for reception.

The collective receiver has an antenna of the waveguide type. The antenna does not require a special support and can be installed on the roof of a building.

The antenna amplification factor is 23 db. The width of the directional diagram is  $9^\circ$ . In the initial setting it must be oriented with a sufficiently high accuracy on the "Ekran" satellite in accordance with the data computed for a specific place. The receiving apparatus requires virtually no servicing.



Mobile "Mars" station

The "Ekran" satellite receives FM television signals transmitted by a ground space communication station situated in the Moscow region at a frequency of 6 GHz and transmits them in the frequency band 702-726 MHz in the selected servicing zone.

The ground network receiving apparatus receives the FM signals of the "Ekran" satellite in the frequency band 702-726 MHz and transforms them into AM television signals in one of the channels in the meter wavelength range. These signals by means of a surface low-power relay station are transmitted in the zone occupied by a populated place, which ensures the reception of programs by television sets with ordinary collective or individual antennas. The quality of the received signal is no worse than in the zone of servicing of a surface television center.

Testing of the "Ekran" and experimental operation of the existing receiving network, which at the present time includes more than 60 stations, has shown good results.

The further development of the ground network of receiving stations of the "Ekran" type is a matter of time. In order to ensure total coverage of this zone it is only necessary to construct and install the necessary number of receiving stations and low-power relay stations.

The program of Central Television transmitted via the "Ekran" satellite can be received, to be sure, in cities for transmission via ground television transmitters. In this case the quality of the received signal must be greater than in the case of reception with collective receivers.

For this purpose there are special receivers of a higher class. They are supplied with antennas in the form of phased arrays. The antennas are installed on special supports. All the units in the receiving apparatus have a reserve for ensuring a high reliability; built-in measuring instruments ensure the monitoring of the state of the receiver and signal quality. A receiver of this type converts the FM signal received from the "Ekran" satellite into separate signals -- the video signal of the television image and an acoustic signal. From the receiver these signals are fed through a connecting line to a powerful surface television transmitter.

Together with use of the decimeter frequency range, even now the question arises of the use of other ranges for ensuring multiprogram satellite television broadcasting with transmission of programs to different time zones at a time convenient for television viewers.

By a resolution of the World Administrative Radio Conference on Space Communication (Geneva, 1976) the frequency range 11.7-12.5 GHz was allocated for this purpose.

These computations show that the problems of ensuring multiprogram television broadcasting in all countries of the world by time zones can be solved with the optimum use of the frequency range 11.7-12.5 GHz. Plans call for the creation of national systems for satellite television broadcasting in this frequency range on the basis of the international plan for the distribution of frequency bands and satellite positions in geostationary orbit. Such a plan was worked out for the countries of Europe, Asia and Africa by the World Administrative Conference on Satellite Television Broadcasting held in Geneva in January-February 1977.

The Soviet Union has been allocated 70 channels for the transmission of television programs by time zones and five positions in a stationary orbit for the parking of satellites.

The use of the frequency range 11.7-12.5 GHz for TV broadcasting also has difficulties. In this range the attenuation of signals during the propagation of radio waves in the atmosphere is considerably greater due to

absorption in oxygen, water vapor and rain. These losses are three times greater than in the decimeter wavelength range and the sensitivity of ground receivers at the present-day level of technology is approximately three times worse than in the frequency range 620-790 GHz. These factors determine the necessity for installing on-board transmitters with considerably greater powers on television broadcasting satellites.

The creation and launching of the "Molniya-2," "Molniya-3" and "Raduga" communication satellites has considerably broadened the possibilities of long-distance telephonic and telegraphic communication, the transmission of radio programs, phototelegraphic newspaper mats and other information both in the interests of the national economy of the USSR and for international cooperation.

In 1971 an agreement was signed on the creation of an international system for satellite communication known as "Intersputnik." At the present time ground space communication stations in this system have been constructed in the USSR, in the Republic of Cuba, Poland, East Germany, CSSR, Mongolia and Bulgaria and construction is being carried on in other countries.

Telephonic-telegraphic communication and the exchange of TV programs with the use of communication channels on the "Molniya-3" satellites is accomplished between ground stations of the "Intersputnik" system. The needs of the "Intersputnik" system for communication channels can be satisfied at the present time by the use of "Molniya-3" and "Raduga" satellites.

The Soviet Union also interacts with the "Intelsat" satellite communication system. In the USSR a satellite communication station has been constructed in the neighborhood of L'vov; it is intended for operation through the "Intelsat" satellites. A number of socialist countries -- USSR, East Germany, CSSR, Poland and Bulgaria are using the "Intelsat-4" satellite for communication with the United States and Canada.

By an agreement between the USSR and the United States direct communication channels between the USSR and the United States have been established for the leaders of the Soviet Union and the United States with the use of the "Molniya-3" and the "Intelsat-4" communication satellites. These channels, including equipment for Soviet and American space communication ground stations and terminal telephonic-telegraphic equipment, have undergone prolonged tests confirming their high reliability.

In the Soviet Union during the Tenth Five-Year Plan plans call for the further development of a network of satellite communications on the basis of use of new geostationary satellites which have been registered with the designations "Statsionar-4, -5, -6, -7, -8, -9, -10" with the International Telecommunications Union.

For operation via these satellites on the basis of existing "Orbita" stations it will be possible to create an extensive network of receiving and transmitting stations which will ensure duplex telegraphic-telephonic

communication, the reception of several Central Television and sonic radio broadcasting programs, the reception of phototelegraphic images of news-paper mats, and exchange of telecode information among electronic computers.

For the development of a television distribution system with receiving stations which are cheaper than the "Orbita" stations, the satellites of this series will carry communication systems with transmitters which are more powerful than in the "Molniya-2," "Molniya-3" and "Raduga" systems and also narrow-directional on-board antennas. With the use of these communication systems the receiver apparatus with antennas with a diameter of 2-2.5 m are considerably simpler and cheaper than for the "Orbita" stations. Such receiving apparatus, especially in regions not covered by television broadcasting via the "Ekran" satellites, will make possible a considerable broadening of the number of populated places at which the reception of several Central Television programs will be ensured.

In the first stage the "Statsionar-4 and -5" satellites will be used at the time of the Olympic Games of 1980 for television programs, radio broadcasting and telephonic communication with foreign countries. The television programs from the "Statsionar-4, 5" satellites can be received by ground stations in the "Intersputnik" system or other systems operating in the frequency range of these satellites.

The mobile "Mars" stations can be used as ground stations for the reception and transmission of television programs. These stations have dismountable parabolic antennas with a diameter of 7 m; all the receiving-transmitting and channel-forming apparatus of the station is enclosed in three containers.

Such stations are transported by railroad or by several aircraft. In the course of two or three days they can be assembled and prepared for operation.

This review of the development of space communication technology shows how much has been done in such a short time. It is entirely clear that further successes in this new branch will be still more impressive.

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5303  
CSO: 5500

USSR

BRIEFS

YEREVAN TV TOWER COMMISSIONED--In Yerevan a new television tower has been commissioned. It is 308 meters tall and has been built at a height of 1,200 meters above sea level. The new tower will enable the inhabitants of Yerevan and the Ararat Valley to clearly receive two programs of Moscow television and two programs of Yerevan television, including color transmissions. It will also improve radio and television reception over the territory of the entire Armenian Republic. [Moscow Domestic Service in Russian 0500 GMT 30 Dec 77 LD]

CSO: 5500

FRANCE

PRC DELEGATIONS VISIT SPACE, TELECOMMUNICATIONS WORKS

Paris ELECTRONIQUE ACTUALITES in French 25 Nov 77 p 10

[Unsigned article: "Two Chinese Delegations to Paris Visit Our Space and Telecommunications Industries"]

[Text] Two large Chinese delegations specialized in the fields of aeronautics and telecommunications, are in France for about two weeks. They follow a delegation of electronics specialists which was here three weeks ago.

During their stay in France, the two delegations will visit not only official organizations and laboratories, but also plants which manufacture equipment used for space programs and for the installation of telecommunication networks. As a space and nuclear power faced with problems created by its territorial size, and under its new leadership, China appears determined to modernize its equipment for the new forward leap which it seems to have decided

Led by Chen Chien, vice-chairman of the Peking Aeronautics and Aeronautics Society, the delegation of space specialists arrived on 14 November; it will visit the installations of the National Center for Space Studies (CNES), of Aerospatiale, of Thomson-CSF, and of the Societe Europeene de Propulsion (European Propulsion Company), which manufactures and installs the various elements of the Ariane rocket and of satellites. Led by Li Lin Tchuan, director general of Chinese Telecommunications, the second delegation will similarly visit the installations of the Tuilleries or Roissy Central, of the Teleinformation Promotion Center, of the LTT Cable Works, of CIT-Alcatel, of SAGEM, and of the National Center for Telecommunications Studies at Lannion (Cotes du Nord), as well as various other centers or industrial companies in Toulouse, Nantes, or the Paris region.

In the wake of the electronics specialists, the interest shown by the two delegations of engineers and university personnel -- researchers all -- in aerospace and telecommunications technology, appears to indicate that Peking may be evaluating the possibility of providing a satellite telecommunications system for China. Already a member of Intelsat, the international organization

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for satellite telecommunications, and already endowed with receiver stations for international communications, China could be seeking to install a future "domestic" system of satellite telecommunications, for which it would find it useful to have a specialized satellite.

While China has launched seven satellites between 24 April 1970 and 8 December 1976, it is still at the beginning stage in this domain where complex problems must be solved. Which may explain the many delegations and recently made appeal to Chinese abroad, for the desired modernization of industry, of national defense, and of science and technology.

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SWEDEN

COSTS, ADVANTAGES OF NORDSAT WEIGHED

Stockholm NORDISK KONTAKT in Swedish 30 Nov 77 pp 857-859

[Article by Undersecretary of State Bert Levin: "The Nordic TV Cooperation"]

[Text] With a satellite it is technically possible to transmit directly all Nordic radio and TV programs--at present 11 radio and 7 TV programs--to all Nordic countries.

It is technically possible, but is it also desirable?

The cost for satellites and carrier rockets is estimated at approximately 575 million kronor. This sounds like a lot, but it is not so bad if it is realized that the amount must be distributed over five countries and 7 years. One can, as a pure example of a calculation, assume that each TV owner in Scandinavia through the license fee must pay an equal share of the cost. Then it is calculated that the license fee will be increased by 15 kronor.

Then one will need attachments to the TV sets themselves and the antenna. The costs for these attachments not including the installations may vary from approximately 200 to 1,500 kronor depending upon whether the TV owner can share the costs with others through a central antenna. In any case, it involves a one-time cost comparable to the cost when receivers and antennas had to be changed in connection with the introduction of TV 2. According to the radio report, the attachment to receive a transmission of TV programs with text for the pictures costs 400-500 kronor. Sweden's Radio is assuming the amount will be smaller.

There are other costs, whose sizes so far are difficult to determine. They include compensations to the producers when their contributions are spread over a larger--at least potentially larger--public. They also include considerable costs for translating the programs. If these costs are spread over all licenses they might come to approximately 20 kronor per year.

## Continued Investigations for a More Reliable Basis

All these economic calculations must be taken with a grain of salt. Continued investigations will give a more reliable basis before a decision on the satellite question can be made.

Objections which are worth taking seriously pertain to the cultural-political consequences of a Nordic TV exchange. Will not far too many see far too many poor programs and far too few informative and challenging programs if there were free choice between seven channels? In other words, will people be able to manage their freedom to choose in this field?

In order to be able to evaluate such questions correctly, one must keep in mind that the Nordic TV enterprises have very similar program policy ambitions. In no Nordic country is there an unrestrained commercial TV activity. The social influence is strong in all fields.

Sweden has, like Finland, also already taken the decisive step from the point of view of freedom of choice. This occurred when TV 2 was introduced. Because from the point of view of freedom of choice, the step between 1 and 2 is much greater than between 2 and 7. And not even our biggest cultural puritans want to return to the time when only one TV program was available.

## Cultural Policy Possibilities

A Nordic TV cooperation with many channels also provides cultural-political possibilities which are important to discuss. The approximately 300,000 Finns in Sweden are now being offered a meagre TV diet. Their situation would be decidedly better if they had the possibility of receiving those programs which Finland's TV is transmitting. In a similar way, the approximately equal number of Swedish-speaking people in Finland would have a richer selection if they had access to the programs broadcast by Sweden's Radio.

A Nordic TV cooperation should give new possibilities for other linguistic minorities as well as for other special interest groups. The public basis should also be strong for narrow programs, and the large number of channels should make it considerably easier to comply with the wishes of various minorities. With seven channels it should be possible during the best transmission time to transmit narrow music, hobby, and entertainment programs without giving the large majority which is not interested in such programs any reason to complain. The other channels should be able to meet the wishes of the majorities. Of course, this type of arrangement assumes a certain cooperation and planning between the various broadcasting companies.

Cooperation between the companies would also be necessary concerning the purchase of foreign programs. Approximately one-half of the programs which are broadcast in Scandinavia are bought abroad. Over several years

it is to a large extent the same programs which the Nordic countries buy from abroad. Not much is gained by, during the course of a couple of years, seeing Baretta's costume balls and Kojak's lollipops on four or five different channels. But this is how it might be if there were no coordination.

#### Valuable for Covering the Community

For covering the community there is a value in the multiplicity which a Nordic TV cooperation should give. More ways should crop up for interpreting and reflecting development, especially in the surrounding world. TV cooperation should make it especially possible and natural for more people to follow the social and cultural debate in our neighboring countries. As neglected as this monitoring is in our mass media, this would be a big gain.

Nobody now knows how the viewers would react to the increased selection possibilities which a Nordic TV satellite might give. But it is, as the experience from the two-channel system in Sweden indicates, far from obvious that the viewers generally reject programs on social information and culture and instead unilaterally devour simpler programs. The news programs on TV 1 and TV 2 attract large crowds of viewers.

Theater programs have also demonstrated the ability to keep up with the competition for viewers. On the other hand, many people switch channels or switch off when sports programs are being broadcast.

It is not likely either that the availability of seven TV channels would more than marginally increase the time people allot to TV viewing. This is indicated by the experience from the introduction of TV 2. People have other things to do than to watch TV. The programs in the various channels also generally fall on the same time of day.

In my opinion there are many good reasons why Sweden should constructively cooperate in a continued Nordic exchange of opinions on TV cooperation via satellites. But it is necessary to have more reliable facts and a broader debate before the time will be ripe for the politicians to take a final position on Nordsat--the third really big cooperation project between the neighbor countries in the north. It would be a mistake to draw any conclusions from the fact that the predecessors, the defense alliance and Nordek, failed. Third time lucky?

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TURKEY

BRIEFS

NEW TV RELAY STATION--The new Sivas television relay station will begin operating as of tomorrow. The relay station has a power of 40 kilowatts. According to information from TRT officials, the new station will relay on bank 3, channel 10. [Ankara Domestic Service in Turkish 1700 GMT 22 Dec 77 TA]

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WEST GERMANY

BRIEFS

EUROPEAN SPACE SATELLITE FIRM--Munich--The European space enterprises of Aerospatiale (France) ETCA (Belgium) and Messerschmitt-Boelkow-Blohm (MBB) have signed a contract in Munich on a joint company for operational and communications satellites. The new 'Eurosatellite GMBH' is based in Munich. The founding firms intend, as MBB said today, to bring into the new company their technical experience, particularly in the sector of operational and communications satellites. As its first job 'Eurosatellite' expects to conclude a contract for 'H-Sat' (heavy satellite) the so-called heavy communications satellite of the European space organization ESA for direct radio and television. It was also stated that the company intends to operate worldwide in the operational satellite market. The management of 'Eurosatellite' was given to Rolf Armin of MBB and Francois Turck of Aerospatiale. [Text] [Hamburg DPA in German 1253 GMT 13 Dec 77 LD]

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